

Magmatic CO₂ Record in Pine Needles and Growth Rings at Mammoth Mtn., CA.

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Recent observations of high soil CO₂ concentrations and areas of dying forest on the flanks of Mammoth Mountain, CA, have been attributed to diffuse emission of magmatic CO₂ [1].

Pine needles and tree core samples from red fir (*Abies magnifica*) and lodgepole pine (*Pinus contorta*) were collected from the Horseshoe Lake (HSL) and Chair 12 (CH12) tree kill areas and analyzed for ¹⁴C. The results show a distinct magmatic CO₂ contribution, seen as a depletion in ¹⁴C relative to modern background. Lodgepole pine needles from the HSL tree kill area contained 5% to 65% magmatic carbon. Results from growth ring samples indicate that magmatic CO₂ was first assimilated during the 1990 growth season, confirming the link between the onset of CO₂ emission and an episode of seismic activity and deformation observed in 1989-1990. Further studies are being conducted to determine the extent of influence of magmatic CO₂ in the area, and whether there is evidence of magmatic CO₂ emission preceding other volcanic eruptions.

[1] C D Farrar et al. (1995) *Nature*, in press.

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